

REMARKS

Applicants would like to thank the Examiner for the careful review of the application. The Examiner obviously spent considerable time on this application and such effort is respectfully appreciated.

On page 2 of the Office Action, the Examiner questioned language on page 13, lines 18 and 21 of the Application. Applicant believes the method step explained in this paragraph is correctly explained. With reference to Figure 2, a method step is explained which is used to assure that for measuring the second pressure value of the surroundings, the pressure sensor is actually brought above the fluid surface by lowering the fluid surface under the vertical position of the pressure sensor. Figure 2 shows the case in which the fluid surface has not been brought in a vertical position under the pressure sensor. Therefore, after switching off the pump after the interval t_1 the signal of the pressure sensor directly increases again, since the fluid level in the pump well rises because fluid is flowing into the pump well. This is the case in which the same amount of fluid is pumped out by the pump is at the same time flowing into the pump well. This makes it impossible for the pump to lower the fluid surface under the level of the pressure sensor. In view of this, paragraph 36 on page 13 with reference to Figure 2 explains a method step for evaluating whether after the interval t_1 the pressure of the surroundings is detected or whether the pressure sensor still detects a pressure in the fluid.

On page 2 of the Office Action, the Examiner objected to the specification because of various informalities and for clarification. Applicants have amended the specification as shown and believe it is now in good form. The amendments do not introduce new matter.

On page 3 of the Office Action, the Examiner rejected claims 1 – 11, 21 and 22 under 35 USC § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants have amended the claims as shown and believe they are now in good form. As to claim 14,

Applicants have amended it to be consistent with the amended claim 1 and the specification. It is believed this claim is now in good form.

On page 4 of the Office Action, the Examiner rejected claims 1, 2 and 3 under 35 USC § 102(b) as being anticipated by Arai (U.S. Patent No. 5,553,481). Applicants have amended claim 1 to include further limitations and have cancelled claim 2. In view of the claims as now shown and for the reasons mentioned below, Applicants believe the claims, as amended, are not anticipated by Arai and should be allowed.

Before addressing Arai, Applicants wish to point out that claims 1 and 14 are directed to a pump system, in particular, a submersible pump used in a pump well to pump water out if the water level in the pump well reaches a predetermined level.

In the past, a switch for starting a pump may be either a float switch or a pressure sensor. A pressure sensor is installed at the pump placed in the bottom of the pump well (i.e., under water). Depending on the height of the water surface above the pressure sensor, the pressure detected by the sensor is varying so that the detected pressure is generally proportional to the vertical position of the water surface. However, in this detection of the water level, there may be an error depending on variations of the surrounding air pressure. Therefore, in the prior art, a second pressure sensor outside the pump well for detecting the air pressure or a pipe leading from outside the pump well to the control unit at the pump was used to continuously detect the pressure of the surrounding air to correct the pressure value detected in the water to evaluate the exact vertical position of the liquid level or liquid surface above the pump.

In view of this prior art it is the object of the invention to provide an improved method for correcting a pressure value in a level sensor of a submersible pump detected in the fluid to be delivered on the basis of a pressure value detected in the surrounding which allows a simplified design of the level sensor. This object is achieved by the idea to use a single pressure sensor which detects the first pressure value in the surrounding and the second pressure value in the fluid to be delivered at two different points in time as defined in claim 1.

The main idea of the embodiment covered by claim 3, for example, is to use the same pressure sensor to detect the pressure of the surrounding air and the pressure in

the water without the need of a pipe leading to the outside of the pump well. In practice, this is done by lowering the water level under the level of the pressure sensor, so that the pressure sensor is positioned above the surface of the water and can detect the pressure of the surrounding air. To do this, a pressure in the water is detected and a second pressure outside the water is detected. Applicants have added new claim 23 that, hopefully, also focuses on this concept.

The prior art known from Arai refers to an injection molding machine cannot be relevant in view of such a pump system, since the person skilled in the art working on an improvement of a pump system, in particular a submersible pump would never search in the field of injection molding for a solution to the problem to be solved, i.e., concerning the design of the pump switch. Thus, Arai is really non-analogous art because there would be no motivation to look to Arai to overcome any problems relative to a submersible pump.

Moreover, even if it were obvious to look to Arai for a solution, the solution would still fail to teach of Applicants' embodiment covered in claim 1, for example.

Indeed, Arai discloses a pressure detecting apparatus of an injection molding machine is utilized for always keeping an accurate zero adjustment point and accurately and precisely detecting pressure without being influenced by temperature drift. The pressure detecting apparatus includes pressure sensors for detecting the oil pressures of hydraulic cylinders such as injection cylinders. Correction value computing sections are provided for obtaining detected pressure values according to the outputs of the pressure sensors in a period in which the oil pressures theoretically become zero as correction values. Correction value storing sections are provided for storing the obtained correction values. Pressure correcting sections are provided for correcting the detected pressure values by the correction values according to the outputs of the pressure sensors at a time of pressure detection.

In contrast, as claimed in the amended claim 1, the method according to the amended claim 1 is used in a level sensor of a submersible pump. Submersible pumps are used to pump a fluid, in particular water, from a pump well or pump sump. Such pumps usually include a level sensor detecting the level of the fluid or water above the

pump (i.e., the vertical position of the surface). The pump is not continuously running, but started, when the fluid level reaches a predetermined level above the pump placed at the bottom of the pump well. This is, for example, the predefined level at which the pump well is completely filled with water. Then, the pump is started to pump the water out of the pump well and when the fluid level reaches a minimum level, the pump is stopped until the fluid level again reaches the predetermined maximum level at which the pump is started again. The fluid level is detected by the fluid pressure at the pump because the fluid pressure is varying depending on the height of the water above the pump. In view of this, the term "level" in claim 1 does not refer to a pressure level but to a fluid level. Applicants claim 1 recites the elements of "a pressure sensor serving as said level sensor and at one point in time as a first pressure value the pressure of the surroundings is detected by said pressure sensor and at another point in time as a second pressure value the pressure of the fluid to be delivered by the pump is detected by said pressure sensor, and wherein said second pressure value is corrected on basis at said first pressure value by evaluating the pressure difference between the second and first pressure value."

As can be seen, Applicants have amended claim 1 to clarify that a pressure value is corrected on the basis of a second pressure value detected before. In view of the above amendments, Applicants believe claim 1 is not anticipated by Aria and is now in condition for allowance and such allowance is respectfully requested.

Applicants' claims 3 – 13 depend either directly or indirectly from claim 1 and contain limitations in addition to the limitations of claim 1. Applicants believe these claims are also in condition for allowance.

On page 5 of the Office Action, the Examiner rejected claim 4 under 35 USC 103(a) as being unpatentable over Arai. In view of the above clarifying amendments to claim 1 and for the reasons mentioned earlier relative to claim 1, Applicants believe claim 4 is not unpatentable over Arai and should be allowed.

Applicants have amended claim 14 as shown to contain similar limitations as to those cited in claim 1 and again respectfully requests that this claim and dependent claims 15 – 20 be examined along with the claims currently under consideration.

For all the foregoing reasons and in view of the amended claims as now presented, Applicant believes this case is now in condition for allowance and such allowance is respectfully requested.

Applicant is filing concurrently under separate cover a request for a one month extension of time.

The Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. 1.16 and 1.17 which may be required by this paper, or to credit any overpayment, to **Deposit Account No. 50-1287**. Applicants hereby provide a general request for any extension of time which may be required at any time during the prosecution of the application. The Commissioner is also authorized to charge any fees which have not been previously paid for by check and which are required during the prosecution of this application to **Deposit Account No. 50-1287**. (Should Deposit Account No. 50-1287 be deficient, please charge any further deficiencies to Deposit Account No. 10-0220.)

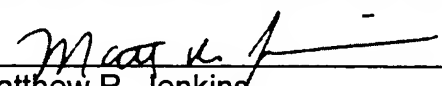
Applicants invite the Examiner to contact the undersigned via telephone with any questions or comments regarding this case.

APPLICANTS HAVE SPENT CONSIDERABLE TIME AMENDING THE APPLICATION AS SHOWN AND BELIEVE IT IS NOW IN GOOD FORM. APPLICANTS RESPECTFULLY REQUEST AN INTERVIEW WITH THE EXAMINER IF THE EXAMINER DOES NOT BELIEVE THIS AMENDMENT PLACES THE APPLICATION IN CONDITION FOR ALLOWANCE.

Reconsideration and favorable action are respectfully requested.

Respectfully submitted,

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